

Listing of Claims

CLAIMS:

1. (original) A method for providing a mixture of drilling fluid and beads into a flow of drilling fluid flowing upwardly within a riser, the method comprising introducing an initial stream including a mixture of drilling fluid and beads into a hydrocyclone, processing the initial stream with the hydrocyclone producing a first stream and a second stream, the first stream containing drilling fluid and beads and the second stream containing drilling fluid, and feeding the first stream to shale shaker apparatus producing a primary stream and a secondary stream, the primary stream including beads and drilling fluid.

2. (original) The method of claim 1 wherein the initial stream is about 50% beads by volume and about 50% drilling fluid by volume.

3. (original) The method of claim 1 wherein the beads are hollow glass beads.

4. (original) The method of claim 1 wherein the second stream is drilling fluid substantially free of beads.

5. (original) The method of claim 1 wherein the first stream is, by volume, between 10% to 30% beads and 70% to 90% drilling fluid.

6. (original) The method of claim 1 wherein the first stream is, by volume, about 20% beads and about 80% drilling fluid.

7. (original) The method of claim 1 wherein the shale shaker apparatus includes at least one shale shaker having vibrating apparatus able to produce forces of at least 5.5 G force.

8. (original) The method of claim 1 wherein the shale shaker apparatus includes at least one shale shaker having vibrating apparatus able to produce forces of at least 6.2 G force.

9. (original) The method of claim 1 wherein the primary stream is, by volume, about 50% beads and about 50% drilling fluid.

10. (original) The method of claim 1 wherein the hydrocyclone has an interior lined with soft material to reduce bead breakage.

1 11. (original) The method of claim 1 further comprising

2 feeding the primary stream into a flow of drilling fluid flowing
3 upwardly within a riser to reduce density of said drilling fluid flowing upwardly
4 within the riser.

1 12. (original) A method for providing a mixture of drilling fluid and beads into
2 a flow of drilling fluid flowing upwardly within a riser, the method comprising

3 introducing an initial stream including a mixture of drilling fluid and
4 beads into a hydrocyclone,

5 processing the initial stream with the hydrocyclone producing a
6 first stream and a second stream, the first stream containing drilling fluid and
7 beads and the second stream containing drilling fluid, and

8 feeding the first stream to shale shaker apparatus producing a
9 primary stream and a secondary stream, the primary stream including beads and
10 drilling fluid,

11 wherein the second stream is drilling fluid substantially free of
12 beads,

13 wherein the first stream is, by volume, between 10% to 30%
14 beads and 70% to 90% drilling fluid,

15 wherein the shale shaker apparatus includes at least one shale
16 shaker having vibrating apparatus able to produce forces of at least 5.5 G force,

17 wherein the primary stream is, by volume, about 50% beads and
18 about 50% drilling fluid, and

19 feeding the primary stream into a flow of drilling fluid flowing
20 upwardly within a riser to reduce density of said drilling fluid flowing upwardly
21 within the riser.

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23 13. - 18. Cancelled.

1 19. (original) A method for providing a mixture of drilling fluid and beads
2 into a flow of drilling fluid flowing upwardly within a riser, the method comprising

3 introducing an initial stream including a mixture of drilling fluid and

4 beads into a hydrocyclone,

5 processing the initial stream with the hydrocyclone producing a
6 first stream and a second stream, the first stream containing drilling fluid and
7 beads and the second stream containing drilling fluid, and

8 feeding the first stream to centrifugal liquid/liquid separator
9 apparatus producing a primary stream and a secondary stream, the primary
10 stream including beads and drilling fluid.

1 20. (original) The method of claim 19 wherein the beads are hollow glass
2 beads.

1 21. (original) The method of claim 19 wherein the secondary stream is drilling
2 fluid substantially free of beads.

1 22. (original) A method for providing a mixture of drilling fluid and beads into
2 a flow of drilling fluid, the method comprising

3 introducing an initial stream including a mixture of drilling fluid and
4 beads into a hydrocyclone,

5 processing the initial stream with the hydrocyclone producing a
6 first stream and a second stream, the first stream containing drilling fluid and
7 beads and the second stream containing drilling fluid, and

8 feeding the first stream to separation apparatus producing a
9 primary stream and a secondary stream, the primary stream including beads and
10 drilling fluid.

1 23. (original) A drilling method comprising

2 drilling with drilling apparatus a wellbore down into earth from an
3 earth surface downwardly,

4 flowing drilling fluid down into the drilling apparatus while drilling,
5 flowing drilling fluid and other material upwardly within the
6 wellbore away from the drilling apparatus,

7 providing a mixture and flowing it into the drilling fluid, the mixture
8 comprising drilling fluid and density-reducing beads, the mixture produced by
9 introducing an initial stream including drilling fluid and beads into a
10 hydrocyclone,

11 processing the initial stream with the hydrocyclone producing a
12 first stream and a second stream, the first stream containing drilling fluid and
13 beads and the second stream containing drilling fluid, and

14 feeding the first stream to separation apparatus producing a
15 primary stream including beads and drilling fluid, and

16 flowing the primary stream into the wellbore.

1 24. (original) The method of claim 23 wherein the separation apparatus is from
2 the group consisting of shale shaker apparatus and centrifugal liquid/liquid separation
3 apparatus.

1 25. (new) A method for moving drilling fluid into and out of a wellbore, the
2 wellbore having therein drilling apparatus, and an annulus for fluid flow between an
3 exterior of the drilling apparatus and an interior surface of the wellbore, the wellbore
4 extending from an earth surface down into the earth, the method comprising

5 flowing drilling fluid down into the drilling apparatus and out
6 therefrom into the annulus,

7 flowing the drilling fluid upwardly in the annulus back to the earth
8 surface,

9 pumping into the drilling fluid flowing upwardly in the annulus a
10 primary stream containing a mixture of drilling fluid and beads to reduce density
11 of the drilling fluid flowing upwardly in the annulus,

12 the primary stream is produced by feeding a first stream to shale
13 shaker apparatus and thereby producing the primary stream as overflow
14 material off a top of the shale shaker apparatus,

15 producing the primary stream by flowing an output stream from
16 hydrocyclone apparatus to the shale shaker apparatus, and

17 the output stream including drilling fluid and beads.

1 26. (new) The method of claim 25 wherein the beads are hollow glass beads.

1 27. (new) The method of claim 25 wherein the initial stream is about 50%
2 beads by volume and about 50% drilling fluid by volume.

1 28. (new) A method for providing a mixture of drilling fluid and beads into a
2 flow of drilling fluid flowing upwardly within a riser, the method comprising

3 continuously introducing an initial stream including a mixture of
4 drilling fluid and beads into a hydrocyclone,
5 processing the initial stream with the hydrocyclone producing a
6 first stream and a second stream, the first stream containing drilling fluid and
7 beads and the second stream containing drilling fluid,
8 continuously producing the first stream,
9 continuously feeding the first stream into the riser to continuously
10 reduce density of drilling fluid therein,
11 continuously feeding the first stream to shale shaker apparatus
12 producing a primary stream of drilling fluid and beads, and
13 feeding the primary stream into the annulus.